# REAL-TIME WATER LEAK DETECTION AND ANALYSIS TOOLS.

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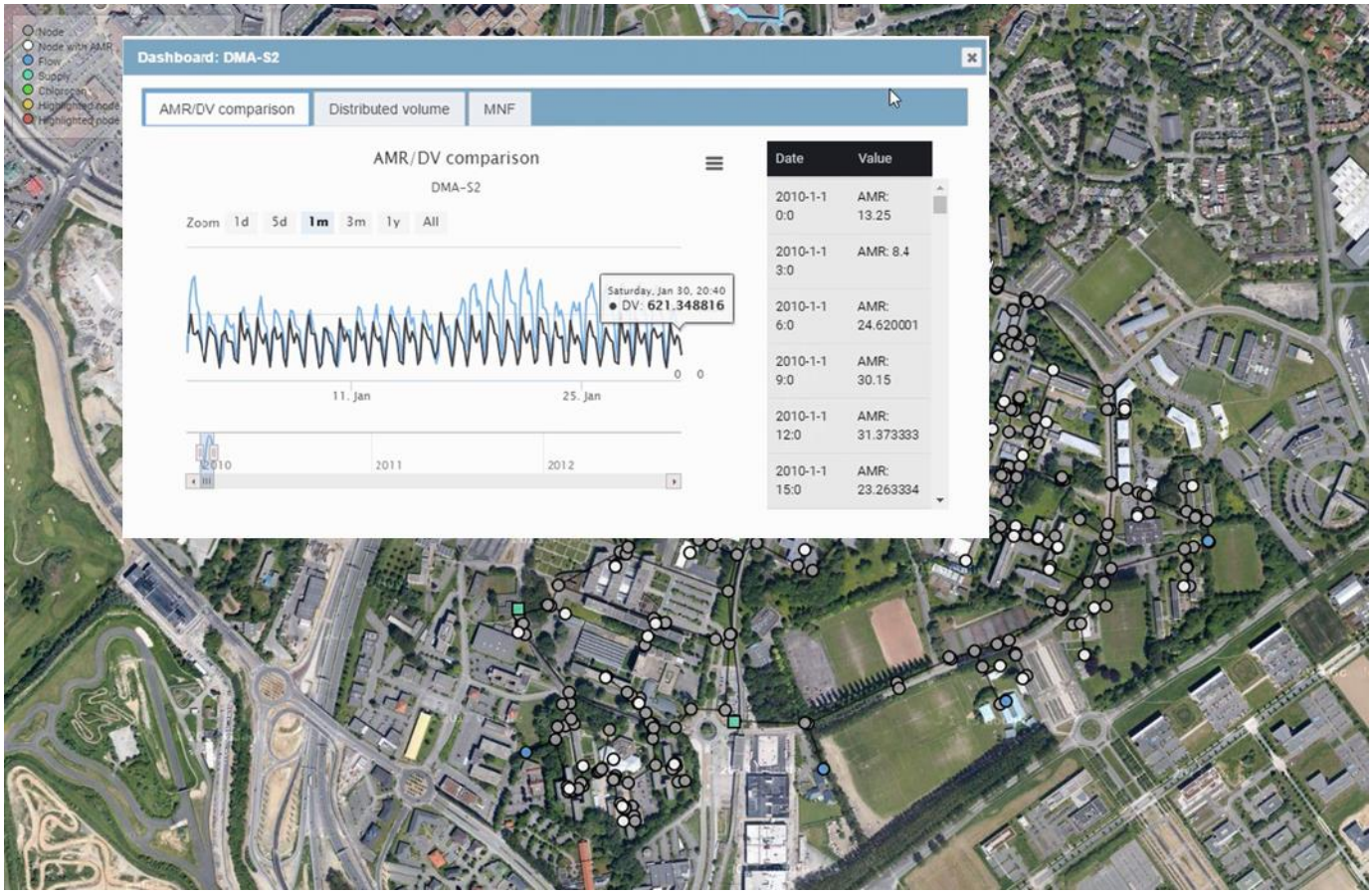


**INCOM – Leak Detection by comparing Distributed Volume Vs. Consumption**
**Location: Lille University of Science and Technology**

## INCOM Project - ABSTRACT

The methods and tools for leakage detection currently used by the industry (F. Montiel, B. Nguyen - 2011) are based on the analysis of near real-time flow-meter data of in-flow distributed volume change variations and AMR consumption data. These tools require data fusion from different data acquisition systems (Real-time Information, AMR, and "intelligent" sensors), combined with the expertise of the operators for the identification and diagnostics of the system anomalies.

For the purpose of leakage detection, the network is naturally or artificially separated into topographically based sub-networks, which are isolated from each other by valves and are controlled by flow-meters. Each sub-network is artificially divided with flow-meters into District Metering Areas (DMA). The anomaly detection analysis is based upon:

- Brutal pressure change measurement - The pressure regulation enables a leakage detection (pipe break) when a brutal change in the pressure is observed. For the case where the hydraulic network is regulated in pressure, the pressure level has to be stable. A brutal drop of pressure on the network is the indication of an incident. This incident could be due to different causes as, for example, a pipe break or sensor defaults. The information delivered has to be correlated to other information to confirm the origin of the drop. While a leakage due to pipe burst can be detected by the brutal drop of pressure in the area considered a progressive leakage cannot be observed by this method due to the pressure regulation.

- Leakage detection based upon the analysis of flow-meter data of in-flow distributed volume and AMR consumption data – for this purpose, the real-time inflow volume distributed in a specific area could be compared with historical volume record in this area, using indicators such as:

    - Variation of the daily water distributed in the area, sub-network and network, which are compared for a specific area with historical volume record of daily consumption curves in this area obtained for a reference date. The reference date needs to be defined

    - Average night area volume – which is a sensitive indicator, independent of the day of the week with a relatively high leak signal to "normal" level ratio

The purpose of this paper is to present the methodology for leak detection and sensor health verification currently used by the Eau De Paris operators and the rationale of building a business case for a corporate investment in feasibility assessment and pilot scale demo-simulations of the functionalities of an Intelligent Network Control & On-site Monitoring (INCOM) prototype system for automating the current leak detection operators' experience and practice. It will also describe the objectives and scope of the INCOM feasibility assessment and demonstration project which is currently conducted by an Industry-University collaborative consortium through the W-SMART R&D Center at the University of Lille. The purpose of the INCOM project is to assess the adaptation and integration of artificial intelligence based control algorithms for improving data quality control, reliability and efficiency of the current leak detection practice and supports the system operator(s) in "intelligent" near real-time system monitoring and leak detection for preventive and proactive rather than reactive water distribution system management.